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IN THIS ISSUE

German Dye Plants as Potential Arsenals

Official Report of British Commission Gives Facts Showing Menace to World Peace

Congress Resumes—The War Trade Board

Editorials

Foreign Dyes Licensed for March Import

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AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

"Circulated Everywhere Dyestuffs Are Used"

Vol. 8 New York, April 11, 1921 No. 15

GERMAN DYE PLANTS AS POTENTIAL ARSENALS

Official Report of British Commission Gives Startling Facts Showing German Factories as Menace to World Peace

POTENTIAL arsenals are the German dye and chemical factories, as shown from the report of the British Mission sent to visit such establishments in the Occupied Zone, which has just been published in the "Journal of Industrial and Engineering Chemistry," the official organ of the American Chemical Society.

Much has been written within the last two years about the use of the dye plants of Germany as the source of her supply of poison gas during the war. Under the heading of "Specific Facts" the actual details of the report, with names of the factories, their output, and their normal capacity are now given in such a way that the general public may grasp the situation. The report is signed by Major General H. Hartley, who was associated with British army officers and chemical experts, as well as with delegates from the Allied Governments, including the United States, France, Italy and Belgium.

"At first," to quote from the official report, "chlorine and phosgene were the main requirements but afterwards a variety of organic substances were employed, all of which were made by the factories of the I. G. combination. Many of these substances were new and difficult to prepare, and rapid production was only possible owing to the speed with which the peace organization of the dye factories could be utilized for that purpose.

"When the German Government wished to introduce a new gas, a conference of the various firms was held at Berlin to determine how the manufacture should be subdivided in order to use existing plants to the best advantage. For instance, the initial stages of the manufacture of mustard gas were carried out at Ludwigshafen and the final stage at Leverkusen.

The table on the second page following shows the production of gas and intermediate products in the various factories visited.

As a result of its visit the British Mission gained a clear impression of

the military value of the German chemical industry and of the preparations made before the outbreak of hostilities.

"Some years before the war," to quote from the report, "a combination was formed by the Bayer, Badische and the A. G. P. A. companies, and somewhat later a second group was formed which included Meister Lucius & Bruning, Caselin & Kalle. During the war these two groups amalgamated and the Griesheim, Elektron, Weilerter Meor, Leonhardt and other smaller companies entered the combination, which is known as the I. G. It was largely owing to the efforts of this combination that Germany was enabled to continue the war in spite of the blockade. The I. G. works produced the bulk of the synthetic ammonia and nitric acid needed for the production of explosives and fertilizers, all the poison gas with the exception of some chlorine and phosgene and a large proportion of the high explosives.

"The principal materials concerned are ammonia, nitric acid, sulphuric acid and chlorine, as it was on the output of these that the war production of chemical munitions depended. The expansion of output by the factories of the I. G. combination during the war is shown by the following tables:

Ammonia (Metric Tons NH_3 per Day)

	1914	1918
Oppau	25	250
Merseburg	(*)	400
Total	25	650

*Nil.

Nitric Acid (Metric Tons 100 Per Cent Acid per Day)

	1914	1918
Leverkusen	56	180
Hochst	150	375
Oppau	(?)	100
Ludwigshafen	40(?)	40
Weiler ter Meer	12	24
Total	258	719

"Oppau has the power to produce now 500 tons HNO_3 daily, still retaining sufficient ammonia to supply the output at Hochst.

Sulphuric Acid (Metric Tons 100 Per Cent Acid per Day)

	1914	1918
Leverkusen	340	470
Hochst	224	280
Ludwigshafen	275	410
Weiler ter Meer	48	60
Total	887	1,220

"No arrangements appear to have been made prior to the outbreak of the war to utilize the resources of any of the dye factories for war purposes, and on mobilization their chemists were called up for military service. After the battle of the Marne the Government realized the need for expanding the output of explosives and most of the chemical works were producing small quantities by the end of 1914. The demands made on them increased during 1915, but it was not until 1916 that plant was laid down to assist in the enormous production of explosives required by the Hindenburg program. Most of the big extensions of the synthetic ammonia and of the nitric and sulphuric acid plants date from this time, many chemists being released from the army and the scientific staff of some of the works being augmented. Standardized plant used for the manufacture of dyes was converted for the production of explosives with remarkable speed; for instance, at Leverkusen a T. N. T. plant producing 250 tons per month was put into operation in six weeks.

"The figures for the output of explosives and gas show the great military value of the factories of the I. G. combination. Although no arrangements had been made to mobilize them at the outbreak of hostilities, they were rapidly converted to war purposes, thanks to their highly trained personnel and the great technical resources of their peace organization. In the future it is clear that every chemical factory must be regarded as a potential arsenal and other nations cannot therefore submit to the domination of certain sections of chemical industry which Germany exercised before the war. For

PROPELLANT EXPLOSIVES AND DETONATING SUBSTANCES

(Metric tons per week.)

Factory	Nitrocellulose powder	Diethyl diphenylurea	Diphenylamine	Nitroglycerine	Cordite paste	Dynamite	Tetryl	Fulminate	Lead azide
Urdingen	..	35	7	..	..	..	..	..	..
Kupppersteg	..	..	..	..	..	..	..	..	0.7
Troisdorf	250	..	..	21	40	..	6	7	0.7
Schlebusch	..	..	..	..	..	..	..	..	..
Opladen	..	..	..	35	75	..	..	..	..
Wiesdorf	..	..	..	(?)50	40	..	..	..	..

OUTPUT OF FINISHED POISON GASES FROM VARIOUS WORKS

	Factory	Monthly Output (metric tons) Average	Monthly Output (metric tons) Maximum	Total Production (if known (tons)	Date of Commencement
1. Chlorine	Leverkusen	600	..	..	Prior to war
	Hochst	240	..	..	do
	Ludwigshafen	860	1,261	38,600	do
2. Phosgene	Leverkusen	..	30	..	do
	Ludwigshafen	288	621	10,682	do
3. Diphosgene	Leverkusen	..	300	..	June, 1915
	Hochst	139	266	3,616	September, 1916
4. Chlorpicrin	Leverkusen	..	200	..	July, 1916
	Hochst	45	101	1,127	August, 1916
5. Xylyl bromide	Leverkusen	..	60	..	March, 1915
6. Bromacetone	Leverkusen	..	20	..	July, 1916
7. Brom acetone, bromethyl, methylketone	Hochst	19	45	685	April, 1915
8. Phenyl carbylamine chloride	Hochst	65	124	721	March, 1917
9. Mustard gas	Leverkusen	..	300	4,500*	Before July, 1917
10. Diphenylchlor arsine	Hochst	150	300	3,000	May, 1917
Diphenylcyano arsine	Hochst	..	..	..	February, 1918
11. Ethyldichlor arsine	Hochst	78	150	1,092	August, 1917
12. Dichlormethyl	Hochst	26	51	233	September, 1917
13. Dibrommethyl ether	Hochst	7	29	69	April, 1917

*Estimated from capacity of plant. Probably the same quantity was produced at some other factory as the output of thiodigylcol from Ludwigshafen would suffice for this.

OUTPUT OF INTERMEDIATE PRODUCTS FOR POISON GAS MANUFACTURE

Finished Gas	Intermediate Products	Total Output (metric tons)	Place of Production	Destination of Intermediate Products
Phenylcarbylamine	Phenyl mustard oil	(*)	Kalle	Hochst
Mustard gas	Thiodiglycol	7,026	Ludwigshafen	Leverkusen and one other factor
Diphenylchlorarsine	Phenyl arsenic acid	1,600	do	Unknown
			Kalle	do
	Diphenylarsenic acid	4,800	Leverkusen	Probably A. G. F. A., Berlin
Ethyldichlorarsine	Ethyl arsenious oxide	840	Ludwigshafen	Hochst

*Not obtained.

NOTE—In addition Hochst produced 3,000 tons of diphenylchor and cyanarsines from own intermediates.

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military security it is essential that each country should have its chemical industry firmly established, and this must be secured as one of the conditions of peace, as otherwise we are leaving Germany in possession of a weapon which will be a permanent menace to the peace of the world.

"The key to Germany's war production of explosives was the Haber process for the production of ammonia from atmospheric nitrogen. It is significant that large scale production by this process only began at the end of 1912, and that in the early part of 1914 great pressure was put on the Badische Company to increase its output. During the war, owing to the extension of the Haber plants at Oppau and Merseburg, Germany has become independent of foreign countries for her supplies of ammonia and nitric acid, substances indispensable for the manufacture not only of high explosives but also of fertilizers for food production. Without such a process Germany could not have made the nitric acid required for her explosives program, nor obtained fertilizers for food production after the supply of Chile saltpeter had been stopped by our blockade, and it is probable that she could not have continued the war after 1916. In the event of another war we might be cut off from supplies of saltpeter.

"The resources of the German dye industry are of no less military importance. Most of the gases employed toward the end of the war were complex organic substances, none of which had been made previously except in small quantities, and some of which were prepared for the first time during the war. Gas warfare will undoubtedly continue to develop in this direction, and in the future organic substances will be employed which we do not know to-day. The use of gas will always offer great opportunities for surprise in military operations, and the experiences of the present war have shown that rapid production of a new gas is essential if the surprise is to be effective. Any country without a well-developed organic chemical industry will be severely handicapped in this respect."

CHEMISTS UNITE TO SUPPLY GOVERNMENT WITH TARIFF DATA

Under a simple plan originated by Dr. Bernhard C. Hesse of this city, the various trade and technical chemical organizations of the country are being brought into co-operation with the Federal Government in securing such information and statistics as are necessary in the reasonable consideration of tariff schedules. Behind the plan is a desire to continue and elaborate the informative data published by the Government last year as a "Summary of Tariff Information." These data have been found to be of such importance to the industries with which they have to do as well as to those members of Congress who are called upon to adjust tariff schedules that Dr. Hesse and other chemical leaders felt that co-operation on the part of the chemical industry would redound to its great benefit.

The work planned falls right in line with the idea of Secretary of Commerce Hoover that statistics are need-

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ed for the advancement of American industry. The aforementioned Government publication will be used as the basis for the collection of new data. It is expected that most of the contributions will be made by members of the several organizations as a result of consulting the Government data and will represent desirable additions, the correction of omissions or errors therein, if any are found. The plan provides that each organization shall appoint a member as a "receiving station." To him all suggestions for amplifying, deleting, or revising the data in the "Summary" must be sent by the individual members. Periodically the information thus obtained is to be gathered at a central station, studied and forwarded to proper Government officials coupled with appropriate recommendations.

Action has already been taken to put the plan in operation. Communications have been sent to the American Institute of Chemical Engineers. the Manufacturing Chemists' Association of the United States, the American Chemical Society, and the American Electrochemical Society. The last-named has already appointed as its "receiving station," its chairman, Dr. Charles A. Doremus. The other societies have not as yet taken definite action in the matter. Dr. David Wesson, of the American Institute of Chemical Engineers. is. however, strongly in favor of the proposal.

FOREIGN DYES LICENSED BY W. T. B. FOR MARCH IMPORT

Following is a complete list giving the types and quantities of dyestuffs for the importation of which into the United States licenses were granted by the War Trade Board during March. This tabulation is being issued by the American Dyes Institute, and it is announced that anyone interested in the manufacture of dyestuffs who has not received a copy may obtain one by application to that organization's headquarters, 320 Broadway, New York.

It should be noted that, in addition to the colors listed, there were items licensed for import from England as follows:

Designation of Dye	England (lbs.)
Alizarine Red IP Paste	1,000
Anthracene Brown Paste	15,000
Coomassie Navy Blue 2RNX	20,000
Cross Dye Green 2G Conc	2,240
Durasol Acid Blue B	3,300
Thional Brilliant Green 4GX	6,800
Total, England	48,340

Designation of Dye	Germany (lbs.	Switzerland (lbs.)
Acid Cyanine BF	500	..
Acid Rhodamine R	..	660
Acid Wool Blue R.L	..	20,000
Algol Brown R. Paste	2,500	..
Alizarine VI Extra Pure.	50	..
Alizarine Black B	500	..
Alizarine Blue Black B	540	..
Alizarine Blue Black BT.	2,000	..
Alizarine Blue SAP	..	200
Alizarine Claret R Paste.	50	..

(*Continued on page* 12.)

Amanil Colors for Cotton
Union Colors for Mixed Goods
Amacid Colors for Dress Goods

FOR MEN'S WEAR

Amacid Chrome Colors
Alizarine Navy Blue
Alizarine Chrome Red
Alizarine Yellow
Alizarine Brown

Basic Colors

American Aniline Products, Inc.
80 FIFTH AVENUE, NEW YORK
Works: Nyack, N. Y.

Offices: Boston, Mass. Philadelphia, Pa. Danville, Va. Chicago, Ill.

AMERICAN DYESTUFF REPORTER
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Pointed solely toward the welfare and growth of the American Dyestuff Industry. Unbiased contributions appreciated.

A. P. HOWES, President
LAURANCE T. CLARK, Editor

Domestic subscription, including technical supplement in 9"x12" size once each month, $5 per year. Foreign, $6. Advertising rates on request.

CONGRESS RESUMES

"We missed our guess; the Senate didn't pass the Dye bill," says Dr. Charles H. Herty editorially in the current issue of the "Journal of Industrial and Engineering Chemistry."

Which provides us with a crumb of comfort, for misery loves company. Not to be outdone in sportsmanship, we seize this occasion to emphasize to our own tolerant circle of acquaintances that as a prognosticator we enjoyed no better luck than the Doctor and others. We were confident that there was enough latent good sense in the august body which has been playing fast and loose with the measure, to insure favorable action before final adjournment—in spite of handicaps and the pressure of last-minute business. But our vision has been sadly out of focus, or else it was a mirage that we saw. At all events, the substance of our prophecy wriggled free from our grasp and escaped into thin air or elsewhere, leaving us with naught but the empty shell; and the Sixty-sixth Congress, passing uneventfully out of existence, remained, up to the very end, quite oblivious to the fact that it was putting us in a terribly embarrassing position—to say nothing of such a relatively unimportant factor as the United States of America as well.

However, if we are game enough to emphasize our amateurish technique as a prophet, we claim the privilege of emphasizing likewise the fact that the legislative mill is again running full time—under New Management. While out on the road drumming up enthusiasm and votes, the present foreman stated that "more business in government, less government in business" was to be his guiding motto while in charge. There never was a better time for the adoption of a motto of that sort, nor should there be any delay in proving its worth. Congress has been convened in extraordinary session for the express purpose of doing much that was left undone by its late predecessor, and if any one of the latter's failures stand out more glaringly than the others it is surely the inaction with respect to the country's military and commercial needs as provided for in the Dye bill.

It is believed that although Congress is already at work, it will take at least two months and possibly longer for the new Chemical Schedule, which is to contain the licensing scheme for dye imports, to arrive at a state where it may be presented. Very well then; two or three months' delay can do little more harm than has already been wrought by the twenty-three which have elapsed since the question was first put, and it will give us time to make assurance doubly sure.

There are several ways in which this can be done; but there is only one "best" way. We were only joking before, of course, but now we are in earnest. We want . . . you to write . . . a letter to . . .

But there, Friend Reader, don't make it necessary for us to go through all *that* again!

THE WAR TRADE BOARD

There are few of our readers who do not know what a sudden termination of the authority and activities of the War Trade Board would mean to the still infant American dye industry in the event that Congress should have failed meanwhile to provide it with adequate protection against its foreign foes. But we feel safe in assuming that not so many of them are aware of the exact functions of that body with respect to this and other industries, nor of the various combinations of circumstances under which it may fade out of the picture.

According, then, to a reply to this query addressed to the Secretary of State, the only active license control now exercised by the War Trade Board Section of the Department of State over imports is an individual license control over the importation into this country of synthetic organic drugs, synthetic organic chemicals, dyes and dyestuffs, and all products derived directly or indirectly from coal tar, including crude and intermediate products and mixtures and compounds of such products. This control is exercised under Section 11 of the Trading with the Enemy Act, approved October 6, 1917.

The present powers of the War Trade Board to regulate trade with the enemy are based on the Executive Order of October 12, 1917, issued by the President in pursuance of the authority vested in him by the Trading with the Enemy Act. This act provides that the words "end of war" as used therein "shall be deemed to mean the date of proclamation of exchange of ratifications of the treaty of peace, unless the President shall, by proclamation, declare a prior date, in which case the date so proclaimed shall be deemed to be the 'end of the war' within the meaning of this act."

In the absence of further legislation by Congress in the matter, the powers of the War Trade Board, it appears, would cease upon the issuance by the President of:

1. An executive order withdrawing the powers vested in the War Trade Board, or
2. A proclamation of exchange of ratifications of the treaty of peace, or
3. A proclamation declaring a prior date as the end of the war.

More than a year ago, when the consummation of official peace seemed imminent, Senator Penrose stepped into the threatened breach with his resolution providing for a continuation of dye import licensing to bridge the gap between "the conclusion of hostilities"

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and action by Congress on the Dye bill. To-day, with the new Administration in charge and with the prospect of some little time yet to elapse before the bill can be incorporated with the new Chemical Schedule, the situation of the industry is equally precarious.

Readers need no reminder of the fact that whatever may happen, the state of uncertainty is extremely detrimental to the present welfare of the dye industry, and the future convenience of the consuming industries. Apparently this cannot, for the present, be helped, but the need of making certain that enough of our representatives have been enlisted for active support to insure passage without a lengthy debate and further vexing delays when the measure *does* reach the floor, is daily becoming more urgent.

FOREIGN DYE LICENSES

(*Continued from page* 9.)

Alizarine Cyanine Green G Extra	1,540	..
Alizarine Emeraldol G	71	..
Alizarine Irisole R Pdr	100	..
Alizarine Red S Powder	200	..
Alizarine Red W Powder	500	..
Alizarine Rubinol GEW	2,200	..
Alizarine Rubinol R	110	..
Alizarine Safirol B Pdr	1,320	..
Anthosine B	100	..
Anthosine 3B	100	..
Anthosine 5B	100	..
Auramine O	..	2,200
Auramine OO	..	1,540
Aurine Soluble in Spirit	300	..
Azo Acid Blue B	..	1,000
Benzo Fast Black L	100	..
Benzo Fast Heliotrope 2BL	200	..
Benzo Fast Scarlet 5BS	220	..
Brilliant Benzo Violet B	25	..
Brilliant Germine L Conc.	100	..
Brilliant Indigo B	2,000	..
Brilliant Lake M	1,540	..
Capri Blue GON	110	..
Chinoline Yellow O	50	..
Chloramine Red 3B	..	2,000
Chloramine Sky Blue FF Conc.	..	4,000
Chlorantine Fast Blue 2GL	..	4,400
Ciba Blue BB Powder	..	4,400
Ciba Blue 2BD Paste	..	5,500
Ciba Bordeaux B Powder	..	440
Ciba Scarlet G, 20% Paste	..	4,400
Ciba Violet B Paste	..	770
Ciba Violet R Paste	..	3,300
Cibanone Black B Powder	..	2,200
Cibanone Orange R Paste	..	861
Cloth Fast Blue R Extra	..	11,025
Cupranile Brown R	..	440
Cutch Brown RR	..	500
Cyananthrol BGAOO	50	..
Diamine Scarlet 3B	224	..
Diamine Scarlet RS	44	..
Diazo Bordeaux 7B	25	..
Diazo Brilliant Black B	25	..
Diazo Brilliant Orange GR Extra	25	..
Diazo Brilliant Scarlet 2BL Extra	200	..
Diazo Brilliant Scarlet ROA Extra	375	..
Diazo Indigo Blue 2RL	2,000	..
Diazo Sky Blue 3G	2,000	..
Diazo Sky Blue 3GL	25	..
Erika B Extra	100	..
Erio Chrome Black A	..	13,000
Erio Violet RL Supra	..	1,000
Fast Acid Blue B	50	..
Geranine G	300	..
Guinea Fast Green B	200	..
Helindone Pink BN Paste	110	..
Helio Bordeaux BL	300	..
Helio Bordeaux BL Pdr	250	..
Indanthrene Blue GC Paste	600	..
Indanthrene Blue 3G Double Paste	600	..
Indanthrene Blue RSP Triple Powder	125	..
Indanthrene Claret B Ex. Paste	1,000	..
Indanthrene Golden Orange RRT	2,000	..
Indanthrene Pink B Paste	1,000	..
Indanthrene Pink BS Powder	50	..
Indanthrene Red BN Ex. Paste	600	..

Cotton Bleachers Use
B & L Bleaching Oil
to produce a foundation
for a Pure White, and
B & L Anti-Chlorine
to neutralize chlorine
Bosson & Lane
Works and Office, Atlantic, Mass.

Indochromine T	..	1,000
Indocyanine B	300	..
Janus Red B	200	..
Janus Yellow G	200	..
Meldola Blue 3R Conc...	..	1,000
Methyl Alkali Blue B....	10	..
Methyl Lyons Blue	..	600
Naphthol AS	3,661	..
Neptune Blue BXX	1,000	..
Neptune Green SBLX ...	10	..
New Blue RS.....	..	660
Nigrophor	1,000	..
Patent Blue A.....	1,000	..
Pyrogene Cutch 2G.....	..	4,400
Rhodamine B Extra	..	2,160
Rhodamine 6G	100	..
Rhodamine 6G Extra ...	478	660
Rhodamine 6GDN Extra.	342	..
Rhodamine 6GN Extra ..	22	..
Saphirol SAP	..	4,409
Solamine Blue FF.....	1,000	..
Thio Indigo Violet 2R Paste	1,500	..
Thional Yellow G.....	....	4,100
Trisulfon Violet N.....	..	220
Turquoise Blue BB.....	10	..
Ursol 4G	115	..
Ursol DF	5	..
Ursol Gray AL	250	..
Ursol Gray B.....	320	..
Ursol SDF	100	..
Ursol SLA	75	..
Victoria Blue B.....	..	660
Xylene Light Yellow 2G.	..	2,000
Totals	41,102	107,905

WOOLWORTH CO. WINS DECISION ON GERMAN COLOR DUTIES

The F. W. Woolworth Company has won in a decision rendered by the Board of United States General Appraisers reducing the duty on certain paints or colors imported from Germany in metal or wooden boxes. The merchandise in question was classified, on instructions from the Treasury Department, as toys, under Paragraph 342 of the existing tariff law, and duty was assessed accordingly at the rate of 35 per cent ad valorem. After reviewing the evidence submitted at the customs hearing Judge Sullivan summarizes the findings of the board as follows:

"Certain paints or colors in metal or wooden boxes, whether or not valued at more or less than 25 or 100 marks per gross respectively, are properly dutiable as artists' colors or paints, at the rate of 20 per cent ad valorem, under Paragraph 63, and not at the rate of 35 per cent ad valorem, as toys, under Paragraph 342."

Judge Sullivan takes occasion in this decision to point out that the Treasury Department is not authorized by law or legal authority to classify merchandise. He further points out that, price or value alone is not necessarily determinative in classifying merchandise for dutiable purposes. Character and use, the general appraiser emphasizes, must likewise be considered.

Announcement has been made by the Cosmos Dyeing & Printing Works, New York, to the effect that the name of this organization has been changed to the Uhlig Piece Dye Works, Inc., while the capital has been increased to $600,000.

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Incorporated
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British
and
American Dyes

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THE DYEING OF ARTIFICIAL SILK

By T. P. Wilson and M. Imison

(*Concluded from last week.*)

No superiority in respect to evenness can be claimed for the products of the German dyeworks. A given dyestuff, whether it be labeled Diamine, Oxamine, Dianol, or Paramine, will be classed as "even" or "uneven," as the case may be, according to its constitution and behavior, which are independent of its German or British prefix. For example, Diamine Sky Blue FF (Cassella), Chlorazol Sky Blue FF (B.D.C.), and Chloramine Sky Blue FF (Sandoz) are all "uneven," as are also Diamine Black BH (Cassella), Oxamine Black BH (Badische), Melantherine BH (Soc. Chem. Ind., Basle), Melantherine BH (Clayton Aniline), and Chloramine Black BH (Sandoz). On the other hand, Sultan Yellow G (B.D.C.) and Chrysophenine G (various makers) are "even," while Cotton Red 4B (Soc. Chem. Ind., Basle), Benzopurpurin 4B (Sandoz), Benzopurpurin 4B (B.D.C.), and Diamine Red 4B (Cassella) are "moderately even."

It has been found, however, that evenness at normal dyeing temperature, 50 deg. Cent., varies according to the molecular weight of the dyestuff used; the arrangement of the groups in the molecule and their nature have apparently no real effect. The dyestuffs of low molecular weight give very even results under normal dyeing conditions, although the silks may vary considerably; while with the same irregular silks the dyestuffs of high molecular weight give uneven results. For example, Rosophenine 10B (mol. wt. 600) is even dyeing, whereas Dianol Sky Blue (mol. wt. 992) is very uneven; Indoine Blue (mol. wt. approx. 521) is very even, but Dianol Fast Pink BK (mol. wt. 944) again is very uneven; Diamine Green B (mol. wt. 812) is fairly uneven, and so on. The result is that fabric made up of artificial silk of varying affinities will show variations in shade when dyed with dyestuffs of high molecular weight and a practically even effect if dyestuffs of low molecular weight are employed.

The lists given below show the direct cotton colors which have been tested and classified as those showing good evenness, those of moderate evenness, and the uneven ones, determinations having been made by dyeing at 50 deg. Cent. The lists may include the same dyestuff under more than one name, and must for the present be regarded as provisional and subject to alteration as research proceeds. A large number of German dyes which have been tested are not included.

Even Dyes (Direct Cotton Colors)

Red—Chlorazol Red A, Chlorazol Pink RD, Chlorazol Fast Bordeaux B, Dianol Fast Red K, Dianol Fast Red FG, Congo Corinth GW, Congo Rubine (all British Dyestuffs Corporation), Chloramine Red B, Chloramine Fast Red F (Sandoz), Rosophenine 10B (Clayton Aniline), Rosathrene B, Rosathrene R, Rosanthrene Bordeaux B, Cotton Red C (S.C.I., Basle).

Brown—Chlorazol Brown GR and Dianol Brown GM (B.D.C.). Trisulphon Brown MB and Chloramine Brown 2R (Sandoz), Cupranil Brown B and Chlorantine Pure Brown 3GL (S.C.I., Basle).

Orange—Congo Orange R (B.D.C.), Paramine Direct Orange R (Holliday).

Yellow—Chrysophenine G (Sandoz), Sultan Yellow G (B.D.C.), Cotton Yellow CH (S.C.I., Basle).

Blue—Indoine Blue (Badische; this color dyes artificial silk without a mordant).

Violet—Chlorazol Violet WB (B.D.C.), Direct Violet 2B (S.C.I., Basle).

Moderately Even Dyes

Red—Brilliant Congo Red R (Sandoz).

Brown—Paramine Direct Brown G (Holliday), Dianol Brown 2494 (B.D.C.).

Orange—Stilbene Orange 4R (Clayton Aniline).

Yellow—Titan Yellow G (B.D.C.).

Green—Dianol Dark Green N (B.D.C.).

Violet—Direct Violet 2R (S.C.I., Basle).

Black—Vulcan Black 2GW (B.D.C.), Direct Fast Black B (S.C.I., Basle).

Uneven Dyes (Direct Cotton Colors)

Red—Direct Fast Scarlet SE (S.C.I., Basle), Chloramine Brill. Red 8B (Sandoz), Dianol Fast Pink BK (B.D.C.).

Brown—Trisulphon Brown B and Trisulphon Bronze B (Sandoz), Cupranil Brown G (S.C.I., Basle).

Orange—Pyrazole Orange G (Sandoz).

Yellow—Dianol Fast Yellow ARX and Afghan Yelow GX (B.D.C.), Paramine Direct Yellow R (Holliday), Oxyphenine R and Oxyphenine GG (Clayton Aniline).

Green—Dianol Green BG (B.D.C.), Direct Green and Direct Green B (Sandoz), Direct Green B (Clayton Aniline).

Blue—Sky Blue FF, Dark Blue B, Blue 2B, Fast Blue G (all makers), and many others.

Violet—Trisulphon Violet B (Sandoz), Direct Violet R (Clayton Aniline), Chlorazol Violet BN, Dianol Violet R9068K, and Dianol Violet R (B.D.C.), Direct Violet N (S.C.I., Basle).

Black—Black BH (all makers), Chlorazol Black E Extra and Dianol Black No. 1 (B.D.C.), Chloramine Black HW and Chloramine Black E Extra (Sandoz), Melantherine TH and Indigene Black BW (S.C.I., Basle).

From these lists it is apparent that there are many direct cotton dyestuffs which when employed in the usual manner will give unsatisfactory results if there is any unevenness in the artificial silk; but, on the other hand, a considerable number will give good and even shades in most colors. The work of investigation into the evenness of dyestuffs is still in progress, but up to the present only one or two satisfactory direct blues have been found, and for most blue shades other methods must be adopted to ensure more even results. It may, however, be posible now that the test of evenness has been ascertained, for manufacturers to produce blue dyestuffs of low molecular weight, and investigations have been started with this end in view.

It has been found, moreover, that it is possible by dyeing at other temperatures to obtain more even results with dyestuffs which, when tested at 50 deg. Cent., were classified as uneven. With higher temperatures of the dyebath, the amounts of dye absorbed by two silks of very different affinities gradually approach one another, so that whereas when dyed at 45 deg. Cent. one silk might be six times as dark as the other, when dyed at 75 deg. Cent. there is very little difference between them; the silks, of course, were immersed in the bath at the proper high temperature and not put into a cool bath and subsequently heated.

When using mixtures of direct cotton dyestuffs even results can only be obtained if all the dyestuffs in the mix-

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ture are even; a dyebath composed of both even and uneven dyes almost invariably gives worse results than the uneven dyes alone. It has also been found that when material dyed with an uneven dye and showing variation in shade is bleached and afterwards redyed with an even dye, the final result will frequently be uneven.

It has already been stated that some of the sulphur colors will help to supply the deficiencies in the direct colors. The sulphur dyes as a class cannot, however, be said to give even results, as many of them do not; but it is fortunate that among the blue sulphur colors some have been found which give even shades on artificial silk of varying affinity. It is possible, therefore, by the use of these to extend considerably the range of colors which do not show unevenness, and the following dyestuffs can be recommended to this end.

EVEN DYESTUFFS (SULPHUR COLORS)

Thionol Sky Blue PX (B.D.C.), Pyrogene Direct Blue RL, Pyrogene Direct Blue (green shade), and Pyrogene Indigo (S.C.I., Basle), Thionone Brilliant Blue G and Thionone Navy Blue B (Holliday).

The sulphur colors named below have been found to give uneven results.

UNEVEN DYES (SULPHUR COLORS)

Blue—Thionol Navy Blue R, Thionol Navy Blue 9055K, Thionol Direct Blue S (B.D.C.), Thionol Dark Blue S and Thionol Dark Blue RL (Sandoz), Thionone Indigo R and Thionone Navy Blue 2R (Holliday).

Black—Thionol Black OG, Thionol Black XXN Conc., and Thionol Black SGG (B.D.C.), Thionone Black Paste (Holliday).

Green—Thionol Green DY (B.D.C.), Pyrogene Green 3G (S.C.I., Basle), Thionol Brill. Green 2G (Sandoz).

Brown—Thionol Brown O (B.D.C.).

The basic colors find considerable application on artificial silk where great fastness in the dyed silk is not essential. In addition to producing extremely bright shades, basic dyes as a class possess the great advantage of giving the most even dyeing results. In fact, almost without exception these colors can be made to give shades which show no sign of unevenness when used to dye artificial silks of very different affinities. It should be noted that these dyes are of low molecular weight.

With the usual method of dyeing—*i. e.*, with a preliminary mordanting with tannic acid and tartar emetic—unevenness may, as stated above, sometimes result, but to a much smaller extent than with many of the direct colors. The most even results are to be obtained by dyeing first in a neutral dyebath, and then fixing in tannic acid and tartar emetic.

The fact that basic colors are, on the whole, even dyeing enhances their value for topping direct or sulphur colors, and extends the range of shades which can be produced, and which might be curtailed by the reduction in the number of dyes available if only those which fulfil the requirements of even dyeing are to be used.

It has been found that among all classes of dyestuffs investigated there are some which under normal conditions of dyeing exhibit great sensitiveness to variations in artificial silk, and special methods have been indicated for dyeing with some colors which tend to make them less sensitive. On the other hand, there are many dyes of undoubted even dyeing properties covering, in one class or another, a full range of colors; and it is hoped that the extended use of these, and the restricted or more careful use of uneven colors, will tend further to eliminate irregularities in dyed viscose silk.—*J. Soc. Chem. Ind.*

M. Ungerleider, formerly with the Central Dyestuffs & Chemical Company and more recently with the Standard Color Company of Boston, is now connected with the National Chemical Products Company, 135 William Street, New York.

The University of Buffalo, Buffalo, N. Y., will build a three-story chemistry building at Niagara Falls Boulevard and Main Street to cost about $400,000.

LIKES AMERICAN DYES BUT ASKS MORE UNIFORMITY

The following statement from Jules A. Kerle, general manager of Firth & Foster Company, Philadelphia, dyers and finishers, was published in a recent issue of the Philadelphia "Public Ledger":

"I believe I cannot do better than to preface my discussion with mention of an episode which was related to me recently, and which exemplifies the situation. An American woman visiting in Paris last fall happened to be wearing a velour coat of American make and dye. She was asked by a French manufacturer if the coat was French, and when she replied that it was made in this country the manufacturer declared that he had not thought it possible to produce such a piece of goods here.

"Indeed, this certainty of the inferior quality of American dye goods was a customary thing in the past, and is only beginning to be changed.

"Piece dyeing is being used to-day to a greater extent than ever and it has shown a remarkable increase in the United States, until it is at the present time a big factor. During this period of extensive increases in the dye industry here the dyers have been instrumental, if not the greatest force of all, in helping the textiles to develop to a point to-day where they can compete with any foreign product and where Americans can proudly claim that their goods are up to the best of the imported goods, if not superior.

"While the industry is still suffering somewhat from the lack of the best dyes, we cannot but acknowledge that the drug and dye producers of America have made great progress, and it is the universal hope that, through gradual improvement they will be able in a short time to put on the market concentrated dyes leaving nothing to be desired. These, I may explain, have reference to the fast colors for wool as well as cotton and silk.

Need of Uniformity

"We cannot impress too firmly on the minds of the dye manufacturers the necessity of producing concentrated dyes which will be reproduced in every shipment sent out by them. At the present time the dyer cannot tell when he receives a shipment of dyes what luck he will have. One barrel is likely to have a dye of an entirely different concentration from another, and through this discrepancy he may ruin quantities of his most valuable work.

"If the dyer can be assured positively of the uniformity of his dye shipments he will know exactly what percentage he has to use, and will thus avoid loss of time and effective work. The standard of dyes must be uniform, and until the makers of dyes realize that fact one serious element in the dye industry will still have to be confronted and remedied.

"And, in direct line with this fact, it cannot be denied that until such uniformity and standard of excellence are assured there will still be just claim for superiority of foreign goods, and America's just place in the world market will continue to be protested and disputed.

"The public is very apt to think of manufacturers when looking at a piece of wearing apparel, and so forgets the important fact that the dyer is a distinct factor, and a very important one, of the textile industry, a part which means practically the

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"As a matter of fact, very much if not everything depends on the dyeing and finishing of every piece of cloth put on the market. The dyer's work has a close bearing on the occupations of the weavers, the spinners and other textile workers. Both the public and the members of the industry as a whole should realize just how important a cog the dye workers form. Then, too, the Government ought to sustain any reasonable demands of this industry, so that this branch can make progress and become a leader in world trade, which would in turn mean success and progress for all the textile industry.

"Only by such co-operation and such understanding of the necessity for encouraging and assisting this great, giant, growing industry can the portended competition of European countries, some of which formerly controlled the situation, be forestalled."

The British Dye Licensing Committee states that bona fide samples of any products restricted under the Dyestuffs (import regulation) act, 1920, will be allowed to be imported free of license. The committee refuse to state a definite maximum weight for such samples, but members may be guided in this matter from the fact that under the old restrictions samples up to one pound in weight were allowed in free.

The German aniline trust has bought an electro-chemical works in Bitterfeld, producing chloride, caustic soda and calcium carbide. The works were valued at more than 100,000,000 marks.

With a capital of $125,000, Keiner & Co. have been incorporated under the laws of New Jersey to manufacture and deal in chemicals, and especially in tanners' dyes and finishes. Jacob Lubetkin is named as agent and headquarters will be in Newark. The incorporators consist of Erich G. Keiner, Irving Wilner and Jacob Lubetkin.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF AMERICAN DYESTUFF REPORTER.

Published weekly at New York, N. Y., for April 1, 1921.

State of New York, County of New York, ss.: Before me, a notary public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the publisher of the American Dyestuff Reporter, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the name and addresses of the publisher, editor, managing editor and business manager are:

Publisher—Alfred P. Howes, 4109 Woolworth Building, New York City. Editor—Laurance T. Clark, 4109 Woolworth Building, New York City. Managing Editor—Laurance T. Clark, 4109 Woolworth Building, New York City. Business Manager—Eugene C. Mayer, 4109 Woolworth Building, New York City.

2. That the owners are: Howes Publishing Co., Inc., 4109 Woolworth Building, New York City; Alfred P. Howes, 4109 Woolworth Building, New York City; Mary K. Howes, Northampton, Mass.; William F. Collins, Upper Montclair, N. J.; Derfla H. Collins, Upper Montclair, N. J.; N. H. Hiller, Carbondale, Pa.; Jos. L. Schroeder, Hartsdale, N. Y.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

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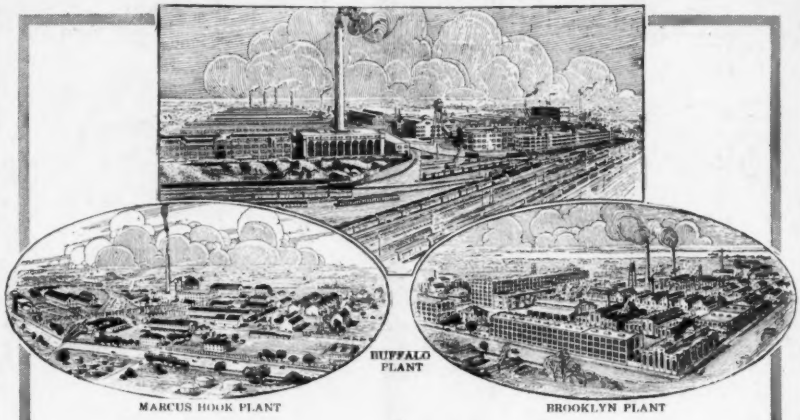

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